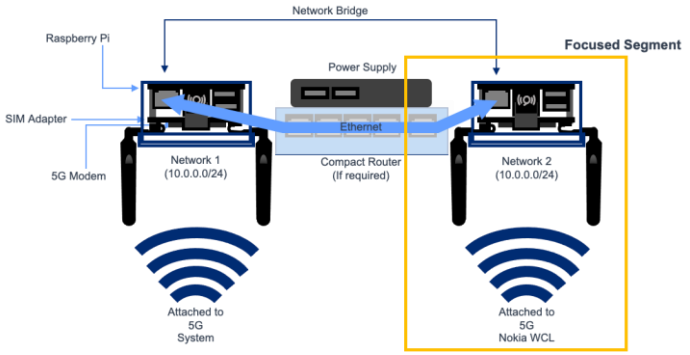
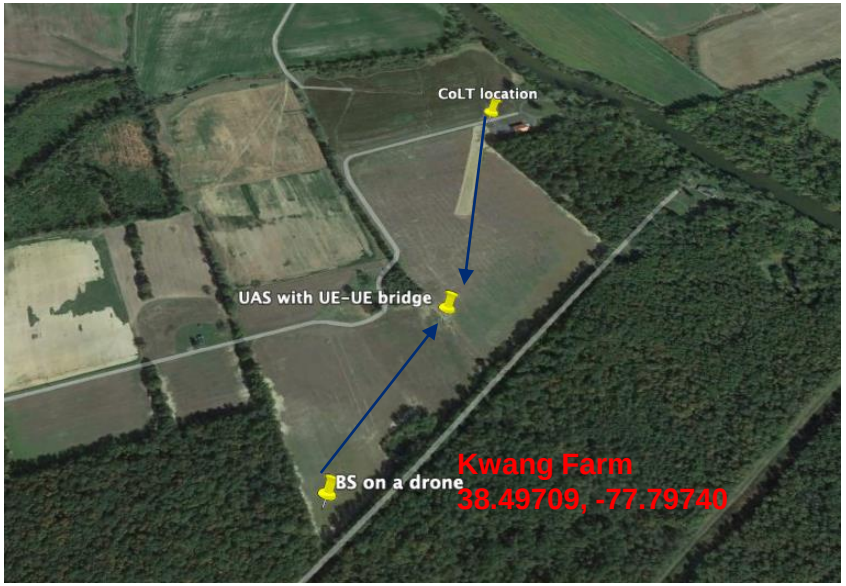
5G UAS Comms Relay Experiment

- Background
  - This Form 442 License Application covers research initiated under HQ003419D0006
  - JHU/APL University Affiliated Research Center (UARC) was funded by OUSD R&E (Amanda Toman, Technical Director/5G) to test the 5G relay capability using an UAS.
  - Use of commercial 5G radios from Ericsson
- Purpose
  - To test the airborne relay capability using a UE-to-UE bridge on an UAS and 5G base stations using Ericsson radios (4422, 4415)
- Method
  - Evaluate video stream quality and data rate over two different gNBs on the ground and an UAS 5G relay
  - Routinely collect radar data to gather statistics on false alarms and environmental clutter (birds, weather, etc.)
- Locations
  - Kwang Farm Remington, VA (38.49709, -77.79740)
- MIRACLE SDR and COTS Radio by Ericsson
  - Frequency :
    - n78: 3300- 3800 MHz
    - n3: 1710-1785 MHz, 1805-1880MHz
    - n41: 2496- 2690 MHz
  - Emission: 5GNR
  - Bandwidth: 20 MHz
- FCC License Request
  - 2 years
- Point-of-contact: Paul Kim 240-228-1239



5G UE-to-UE Relay on an UAS



Emitter/Antenna Information

- Cell on light truck (CoLT)
  - Ericsson Radio AIR 4415 with Kathrein 80010965 antenna
  - Height: Up to 40 ft AGL
  - Gain: 18 dBi
  - EIRP: max 42 dBm
  - 3 dB beamwidth [Az/El]: [60°, 6°]
  - Pointing [relative to North, relative to ground level]: [180°, -8°]
- PONI (transit case base station) node
  - Ericsson Radio 4415 or 442 with Galtronics GP2410-B6636 antenna
  - Height: less than 400 ft above ground level
  - Gain: 14 dBi
  - EIRP: max 38 dBm
  - 3 dB beamwidth [Az/El]: [65°, <20°]
  - Pointing [relative to North, relative to ground level]: [0°, 0°]
- UEs on UAS Node
  - SIMCOM SIM8200EA-M2
  - Two 5G modems with 4 small omni stick antennas pointing straight down
  - Height: Up to 400 ft AGL
  - Gain: 1.2 dBi
  - EIRP: max 20 dBm
  - 3 dB beamwidth [Az/El]: NA
  - Pointing [relative to North, relative to ground level]: N/A